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upon the tomato. This one of the pear and the pod-spot *Colletotrichum* of the bean were at the same time introduced upon different areas of a citron, and the two in growing produced a blending anthracnose blotch made up of a single species of *Colletotrichum*. It is therefore shown that the chain of evidence is strong that all three of the Solanaceous plants are preyed upon by the same *Colletotrichum*, and that it is the one so familiar to truck growers as the pod-spot fungus, namely, *Colletotrichum Lindemuthianum*, S. & M. Whatever differences in appearance upon the various hosts there may be they seem entirely due to the varying conditions which attend the growth of the anthracnose. The microscope is not sufficient to distinguish from which host the fungus has been taken for inspection.

If these cultures give the true relation of the anthracnoses it is evident that the view now held by mycologists may need some modifications to fit the facts. In an economic aspect the information has its value as it shows a close connection between the anthracnoses of the several garden crops. That is, one fruit does not blight to its own kind alone. A decaying tomato or apple is neither its brother's nor its cousin's keeper.

BYRON D. HALSTED.

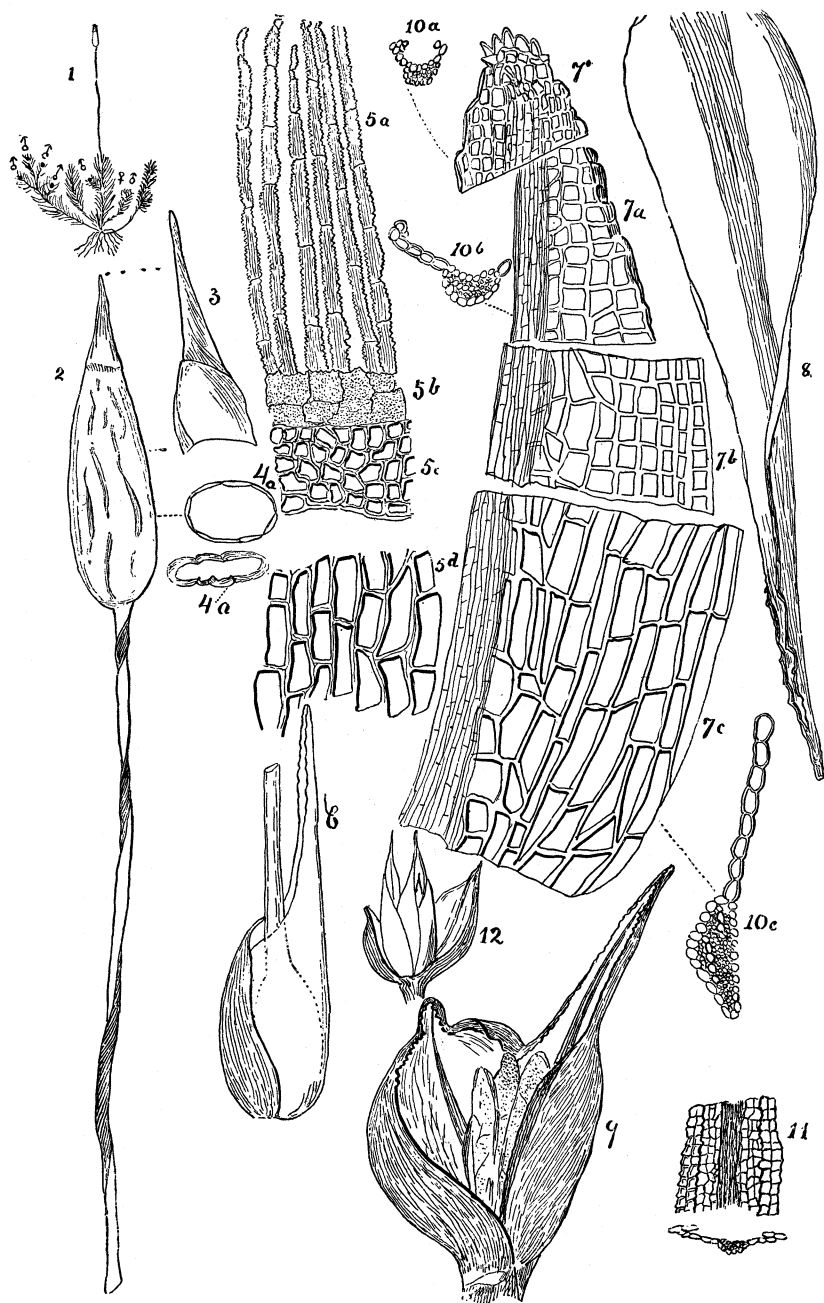
Two New Species of Mosses from Idaho.

BY J. B. LEIBERG.

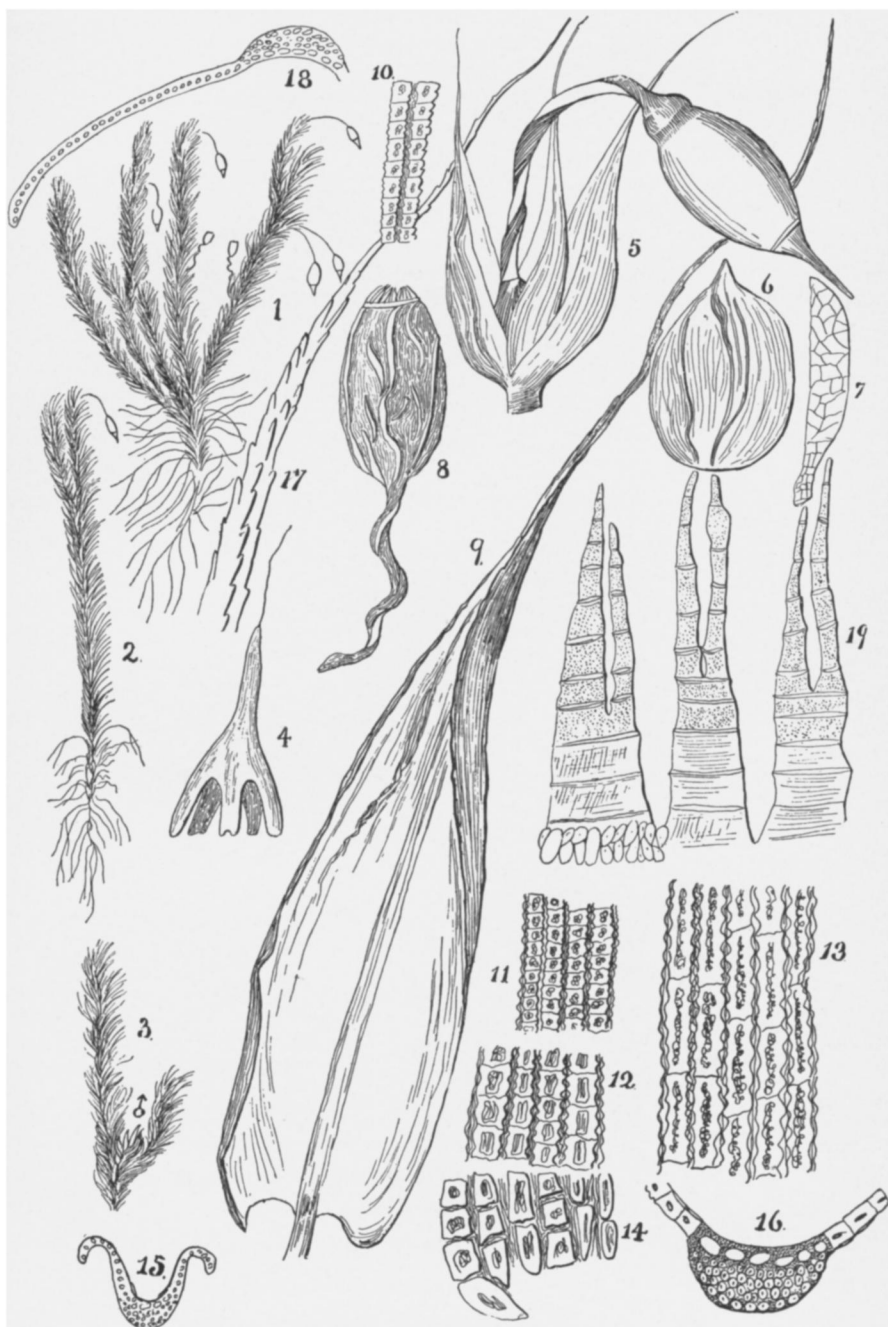
(PLATES CXLIII.—CXLIV.)

DITRICHUM MONTANUM n. sp.—Plants cæspitulose, 1–2 cm. in length, fastigiately branching from the base, above more or less dichotomous. Monoicus, seldom synoicus; antheridia terminal on the apex of the basilar branches and of short axillary branchlets, few, without paraphyses; perigonal leaves 3–5, of two sorts, short, serrulate, concave, apiculate, costate, loosely areolate bracts, and longer, broadly costate, canaliculate ones, more compactly areolate, resembling the stem leaves but shorter, the two sorts occurring together, and now the one and now the other enclosing the antheridia.

Stem leaves erect or slightly curved, lanceolate below, channeled and subulate above with a narrow lamina of two to three rows of cells, subserrulate and inflexed margin of two rows of cells, apex coarsely toothed; costa broad, strong, ceasing below



DITRICHUM MONTANUM, LEIBERG.



GRIMMIA PACHYPHYLLA, LEIBERG.

the apex, above more or less concave on the upper face, convex on the back, flattened below; a row of parenchyma cells (Deuter) all around on the outside and a more or less continuous one through the centre of the costa, the sclerenchyma cells (Stereiden) very small and confined to the interior of the nerve; areolation above and in the middle of hyaline or chlorophyllose, thick-walled quadrate cells, rectangular below, yellowish at the insertion; outer perichaetial leaves similar to the stem leaves, the inner broadly sheathing. Pedicel pale yellow, 1.5–2.5 cm. long, usually twisted a few times when dry. Capsule 2–3 mm. in length, light orange or brown, red and narrowed at the mouth, erect, elliptical; when dry very much compressed laterally, with a few longitudinal wrinkles. Teeth of peristome cleft to the base into two semiterete equal segments, minutely papillose with a faint median line, rather obscured and distantly articulate, at the falling of the lid inter-twisting and breaking away at the articulations, attached to a short, minutely-punctulate, protruding basilar membrane. Annulus double, narrow, dehiscent, of two rows of cells. Lid elongated, conical, reddish, $\frac{1}{4}$ – $\frac{1}{3}$ the length of the capsule. Calyptra long, subulate, mostly persistent and falling with the lid, light greenish, the expanded portion narrow and about $\frac{1}{3}$ the length of the capsule.*

Habitat.—On broken soil, upturned tree-roots, etc., in mountain regions at all elevations up to at least 8,000 feet. Kootenai Co., Idaho, J. B. Leiberger, No. 126, 1889; Suoqualmie Pass, Cascades, C. V. Piper, No. 119, August, 1891.

GRIMMIA PACHYPHYLLA, n. sp. § Rhabdogrimmia. In wide, dense, inflated mats, grayish or yellowish green above, dirty yellow or brown below, repeatedly dichotomous, subsimple plants intermixed, erect or sometimes ascending from a decumbent base, abundantly radiculose to above the primary innovations, robust, 5–12 cm. in height. Leaves closely imbricate when dry, spreading when moist and the upper portion more or less recurved, oblong or broadly lanceolate from an erect open

*Specimens sent by me to J. Breidler, at Vienna, and compared by him with the type of *Ditrichum Knappii* (Jur.) at the Herbarium of the Hof-Museum differ from that type in the clearly-defined, smaller vein, the cells of the upper part of the leaf being larger and more quadrate, the margins incurved. This new species seems to be quite distinct from *D. pallidum*, though like it in its inflorescence and general appearance.

base, not clasping, shortly decurrent at the basal angles, carinate above and reflexed on the margins, strongly costate, the nerve pluri-stratose, more or less channeled, above becoming laminoid and gradually narrowing into a long straight or flexuous hair with a few weak salient or appressed teeth; cells of the areolation elongated-rectangular below, broader, sub-graduate in the middle, small-graduate above, chlorophyllose, all sinuous and the cell walls very thick and dense and remarkably elastic; the margin of the leaf of two or three rows of nearly graduate cells, and the extreme base and decurrent angles of a few irregular, oblong or subrhombic, ones. Inflorescence dioicous; ♂ plants growing mixed with the ♀ usually somewhat shorter and more branched, occurring but sparingly; antheridial buds in the axils of the innovations, occasionally terminal on very short lateral branchlets, perigonal bracts 3-4, short, acute, thinly costate; cells of the upper half of the bract, narrow, short-rectangular or quadrate, sinuous, chlorophyllose, of the lower half broad-rectangular, straight, hyaline; antheridia large, numerous without paraphyses; archegonial inflorescence from secondary branches, sometimes direct from the axils of the innovations.

Capsule oval or oblong 2-5 mm. long, often two from the same perichætium, pendent on a twisted pedicel, 0.5-1 cm. in length, red and narrowed at the mouth, with a distinct collum, substrumose, at least when fresh and mature, erect when dry and pedicel more strongly twisted, longitudinally wrinkled, the ridges prominent, continuous or interrupted, 4-8 in number; perichætial leaves only sheathing to a little above the vaginule, otherwise similar to the stem leaves; lid red, subulate, $\frac{1}{2}$ - $\frac{3}{5}$ of the length of the capsule. Calyptra 4-5 lobed covering the lid only.

Teeth of peristome cleft to below the middle into two segments, sometimes merely lacunose along the median line, thin, minutely papillose above the middle when fresh, articulations few, incurved when dry. Annulus simple, of two rows of thin cells, narrow, strongly persistent, detaching in fragments.

Habitat granite, gneissoid and slate rocks throughout Kootenai Co., Idaho. J. B. Leiberg, No. 250, 1890-92. Characterized from living specimens.

A fine form of the *Rhabdogrimmia* section, most nearly related to *Grimmia decipiens* (Schultz), Lind., from which species it differs mainly in its dioicous inflorescence, its open leaf base, smoother hairy point, its broader basilar, its shorter medial, and its quadrate-

apical areolation, its pluri-stratose nerve, the longer beak of its lid, its narrow and persistent annulus, and the peristome incurved when dry.

EXPLANATION OF FIGURES.

(PLATE CXLIII.)

DITRICHUM MONTANUM, LEIBERG.

- Fig. 1. Plant natural size.
 Fig. 2. Capsule with lid and portion of pedicel.
 Fig. 3. Calyptra.
 Fig. 4. a. Cross-section of capsule at maturity; 4 b. same when old and dry.
 Fig. 5. a. Peristome; 5. b. basilar membrane; 5. c. reticulation of capsule at mouth; 5. d. same near base.
 Fig. 6. One of the sheathing perichætal leaves.
 Fig. 7. Apex of leaf with margin rolled back; 7. a. fragment of upper one-third of leaf; 7. b. fragment of central portion of leaf; 7. c. same at base.
 Fig. 8. Outline of a stem leaf.
 Fig. 9. Two perigonial leaves with antheridia.
 Fig. 10. a., 10. b. and 10. c. sections of the costa and portions of the lamina of a stem leaf.
 Fig. 11. Fragment of leaf from near apex to show double row of marginal cells.
 Fig. 12. Male bud.
 All the figures, except No. 1, highly magnified.

(PLATE CXLIV.)

GRIMMIA PACHYPHYLLA, LEIBERG.

- Fig. 1. A plant of natural size showing usual mode of branching.
 Fig. 2. One of the sub-simple plants growing with the normal form of Fig. 1.
 Fig. 3. Fragment of a branch showing usual position of antheridial inflorescence.
 Fig. 4. Calyptra.
 Fig. 5. Capsule and perichætium.
 Fig. 6. The inner antheridial bract.
 Fig. 7. An antheridium.
 Fig. 8. An old and dry capsule.
 Fig. 9. A stem-leaf.
 Fig. 10. Fragment of leaf margin from near apex of leaf.
 Fig. 11. Upper areolation.
 Fig. 12. Medial areolation.
 Fig. 13. Basilar areolation, about $\times 450$.
 Fig. 14. Cells of the angles and extreme leaf base.
 Fig. 15. Section, unprepared, from upper portion of leaf under low magnification.
 Fig. 16. Section from middle of leaf treated with dilute nitric acid to bring into view the pluristratose character of costa.
 Fig. 17. Hair point of leaf.
 Fig. 18. Section from lower portion of leaf.
 Fig. 19. Three of the teeth of the peristome with fragment of annulus.

All figures except 1 and 2 highly magnified.

Figs. 11, 12, 13 and 14 treated with hot dilute nitric acid to show true forms of cells.

Two New American Mosses.

BY G. N. BEST.

BUXBAUMIA PIPERI, n. sp. Dioicous; stemless; leaves reduced to yellowish ovate-oblong or palmate, crenate-lacinate bracts; areolation oblong-hexagonal; bracts of fertile plants producing long rhizoids, enveloping the fleshy vaginale in a felt-like mass. Seta about 1 cm., arcuate or flexuose, warty, obliquely inserted. Capsule inclined, ovate-oblong, unsymmetric, greenish becoming pale yellow; section broadly elliptical; upper surface not deeply impressed nor strongly margined; neck distinct; cuticle thin, not glossy or but slightly so, rolling back in segments after the loosening of the broadly conical, obtuse operculum. Columella adherent. The membranaceous endostome composed of linear, papillose, hyaline, fluted segments, lightly cohering by their thickened margins, forming a truncated cone. Peristome of a single layer, with rudiments of a second deeply inserted; teeth linear, reddish or dirty white, papillose, articulated, revolute, lightly connate, fitting into the endostomial grooves, as long or nearly so as the segments. Pseudannulus usually of 3 layers, the inner showing traces of teeth more or less distinct. Spores of medium size.

Hab. On rotten wood, or on ground covered with woody debris, in mountainous regions, probably not rare in the North and West, but either overlooked or when found referred to *B. aphylla* or *B. indusiata*. Mason Co. Wash., Mr. C. V. Piper. Kootenai Co. Idaho, Mr. J. B. Leiberg. BULLETIN xvii. 126; xviii. 49.

Remarks: *B. Piperi* is intermediate between *B. aphylla* and *B. indusiata*. The shorter and more curved pedicel, the more erect capsule not markedly depressed nor strongly margined, peristome of a single well developed layer, spores larger, readily separate it from the former. The more symmetrical capsule, peristome of 4 layers, the outer successively shorter, of *B. indusiata* mark it as distinct from the latter. In *B. aphylla* the operculum is usually thimble-shaped, the peristome rudimentary.

Not a little practice is required to manipulate the peristomes and endostomes of these peculiarly interesting plants with satis-